and 1:40 from MLW to existing bottom. The recommended additional design volume is 720,000 cubic yards resulting in a project equilibrium toe of fill of 230 feet. The renourishment interval is 6 years. No hardgrounds exist in the immediate vicinity of this project so no mitigation will be required. A nearshore berm dredged material disposal site has been identified offshore of this project segment.

**275.** Dania. This 0.6 mile reach of beach is presently authorized for periodic nourishment. A modification to a beach restoration and periodic nourishment project is recommended for this project segment component located between DEP monuments R-98 and R-101. Initial restoration of the beach at Dania would fill in the gap between J.U. Lloyd and Hollywood/Hallandale. Due to the small project length, the fill would be designed as a transition between these two all ready constructed projects and help reduce end losses in Segment III.

**276.** The optimal berm width transition between J. U. Lloyd and Hollywood/Hallandale is 125 feet, on the average (i.e., between 100 and 150 feet), with a transition berm height between elevation +10.0 feet and +7.0 NGVD and slopes of 1:15 berm to MLW and 1:40 from MLW to existing bottom. The initial design volume is 208,300 cubic yards. The recommended renourishment interval is 6 years. The distance to the equilibrium toe of fill, including initial fill plus advance nourishment, is 220 feet with a total volume of 460,840 cubic yards. Federal participation in the economic life of this transition project component is recommended.

**Other Broward County Project Segment Alternatives:**

**277.** In addition to the above specific project segments, periodic nourishment as necessary and justified is an existing project feature to the Broward County, Florida project. No change in this project feature is recommended at this time. Dune grassing, as necessary and justified is also recommended for the Broward County shoreline as a cost effective project feature.

**DADE COUNTY**

**Continuation of Port Everglades Inlet (Broward County) to Bakers Haulover Inlet (Dade County):**

**278.** Golden Beach. It is recommended that the Dade County, Florida, Beach Erosion Control and Hurricane Protection Project be modified to include initial restoration and periodic nourishment for the 1.2 mile shoreline located between DEP monuments R-1 and R-7 in Dade County. This project component would fill in a gap between the Dade

County and Broward County authorized projects, decreasing project end losses.

**279.** The optimal berm width in the analysis of this project is 100 feet at elevation +8.2 feet NGVD and slopes of 1:10 berm to MLW and 1:30 from MLW to existing bottom. The initial project design volume is 311,000 cubic yards with a 260 foot toe of fill. The recommended renourishment interval is 6 years. The distance to the recommended equilibrium toe of fill, including initial fill plus advance nourishment is 832 feet with a total volume of 534,660 cubic yards. Mitigation for approximately 5.25 acres of hardground impact may be necessary in association with this project segment. One nearshore berm site has been identified as an alternative maintenance dredged material disposal site.

**280.** Sunny Isles. The 2.65 mile beach fill project segment component located between DEP monuments R-7 and R-20 is authorized and constructed. This segment of the Dade County, Florida project is recommended for modification with an additional 20 feet optimal berm width at elevation +8.2 feet NGVD and slopes of 1:10 berm to MLW and 1:30 from MLW to existing bottom. The recommended additional design volume is 146,700 cubic yards with an additional 200 foot toe of fill extension. No hardgrounds exist in the vicinity of this project so no mitigation will be required. One nearshore berm site has been identified as an alternative maintenance dredged material disposal site.

**Bakers Haulover Inlet to Government Cut:**

**281.** Bal Harbour, Surfside, Miami Beach. The 9.3 mile beach fill project segment located between DEP monuments R-27 and R-74 is authorized and constructed. The only recommended modifications to this project segment are the addition of four nearshore berm sites that have been identified as an alternative maintenance dredged material disposal sites.

**282.** Government Cut. As identified in a previous DM, a sand tightening of Government Cut has been recommended. This sand tightening will help reduce end losses to the southern portion of the Miami Beach project segment and further reduce Government Cut maintenance dredging requirements. The sand tightening project will be undertaken as a separate project modification.

**Project Segments South of Government Cut:**

**283.** Virginia Key/Northern Key Biscayne. Shore protection of Virginia Key and northern Key Biscayne was authorized by

the River and Harbor Act of 1962 (PL 87-874). Construction of the 1.8 mile Virginia Key shoreline and 1.9 mile northern Key Biscayne shoreline was completed in 1969. The Virginia Key shoreline was renourished in 1972 and 13 groins were also constructed. This project was deauthorized in 1990. As documented in the 1992 Rehabilitation Report following Hurricane Andrew, in August 1992, the Virginia Key project was found to be performing well to date. No project segment modification is recommended for Virginia Key at this time.

**284.** Key Biscayne. The 2.3 mile beach fill project located between DEP monuments R-101 and R-113 was initially constructed in 1985 under the authority of Section 103 of the 1962 River and Harbor Act. Nourishment for 50 years was authorized, however, the Federal limit of $1,000,000 under Section 103 has been met. It is recommended that the Dade County project be modified to incorporate this project segment so that Federal participation in periodic nourishment can be continued through the economic life of this project segment. An additional optimal berm width of 10 feet at elevation +8.2 feet NGVD and slopes of 1:10 berm to MLW and 1:30 from MLW to existing bottom is recommended. The additional project design volume is 106,660 cubic yards. The recommended renourishment interval is 7 years.

**Other Dade County Project Segment Alternatives:**

**285.** In addition to the above specific project segment modifications, periodic nourishment as necessary and justified is recommended for all Atlantic Ocean shorelines within Dade County for the economic life of each project segment. Dune grassing, as necessary and justified is also recommended for the Dade County shoreline as a cost effective project feature.

**RECOMMENDED PLAN COST SUMMARY**

**285a.** Costs for the Recommended Plans in Palm Beach, Broward, and Dade Counties can be found in Tables 24, 25, and 26, respectively.

**PLAN IMPLEMENTATION**

**Cost Allocation**

**286.** Section 103(d) of the Water Resources Development Act of 1986 (Public Law 99-662) specifies that the cost of construction measures for beach erosion control are assigned to the appropriate purpose(s) specified in Section 103(c) of the Act. These purposes are normally hurricane and damage reduction and/or separable recreation, and shared in the same percentages as to the purposes to which the costs are

**TABLE 24**
**PALM BEACH COUNTY**
**SUMMARY OF COSTS AND BENEFITS**
**NED PLAN SEGMENTS**

| | Juno/Ocean Cay | Lake Worth Inlet | North Palm Beach | Palm Beach Island |
|---|---|---|---|---|
| COSTS | | | | |
| First Cost (MCACES) | $ 4,236,200 | $ 3,914,300 | $ 7,977,000 | $ 6,572,600 |
| Interest During Construction | $ 81,500 | $ 75,300 | $ 153,500 | $ 126,500 |
| TOTAL AVERAGE ANNUAL COST | $ 631,600 | $ 385,700 | $ 897,600 | $ 1,214,100 |
| BENEFITS | | | | |
| Storm Damage Reduction | $ 4,385,000 | $ 289,900 | $ 1,125,000 | $ 5,431,500 |
| Recreation | $ 813,700 | $ 0 | $ 115,200 | $ 1,164,300 |
| Maintenance Dredging Cost Reduction | $ 0 | $ 204,200 | $ 0 | $ 0 |
| TOTAL ANNUAL BENEFITS | $ 5,198,700 | $ 494,100 | $ 1,240,200 | $ 6,595,800 |
| BENEFIT-TO COST RATIO | 8.23 | 1.28 | 1.38 | 5.43 |
| NET ANNUAL BENEFITS | $ 4,567,100 | $ 108,400 | $ 342,600 | $ 5,381,700 |

| | South Palm Beach | Delray Beach | Highland Beach |
|---|---|---|---|
| COSTS | | | |
| First Cost (MCACES) | $ 5,989,100 | $ 565,300 | $ 7,812,300 |
| Interest During Construction | $ 115,300 | $ 10,900 | $ 150,300 |
| TOTAL AVERAGE ANNUAL COST | $ 1,370,700 | $ 109,000 | $ 1,157,200 |
| BENEFITS | | | |
| Storm Damage Reduction | $ 3,364,700 | $ 57,300 | $ 3,238,900 |
| Recreation | $ 0 | $ 3,118,700 | $ 1,074,800 |
| TOTAL ANNUAL BENEFITS | $ 3,364,700 | $ 3,176,000 | $ 4,313,700 |
| BENEFIT-TO COST RATIO | 2.45 | 29.10 | 3.70 |
| NET ANNUAL BENEFITS | $ 1,994,000 | $ 3,067,000 | $ 3,156,500 |

**TABLE 25**
**BROWARD COUNTY**
**SUMMARY OF COSTS AND BENEFITS**
**NED PLAN SEGMENTS**

| | Deerfield Beach | Pompano | Ft. Lauderdale |
|---|---|---|---|
| COSTS | | | |
| First Cost (MCACES) | $ 7,136,800 | $ 8,628,300 | $ 11,886,600 |
| Interest During Construction | $ 137,300 | $ 199,200 | $ 228,700 |
| TOTAL AVERAGE ANNUAL COST | $ 896,600 | $ 810,600 | $ 1,683,400 |
| BENEFITS | | | |
| Storm Damage Reduction | $ 8,157,100 | $ 1,033,100 | $ 2,026,300 |
| Recreation | $ 62,000 | $ 286,500 | $ 28,900 |
| TOTAL ANNUAL BENEFITS | $ 8,219,100 | $ 1,319,600 | $ 2,055,200 |
| BENEFIT-TO COST RATIO | 9.20 | 1.60 | 1.20 |
| NET ANNUAL BENEFITS | $ 7,322,500 | $ 509,000 | $ 371,800 |

| | Hollywood | Dania |
|---|---|---|
| COSTS | | |
| First Cost (MCACES) | $ 3,567,500 | $ 2,282,700 |
| Interest During Construction | $ 68,700 | $ 43,900 |
| TOTAL AVERAGE ANNUAL COST | $ 805,300 | $ 362,900 |
| BENEFITS | | |
| Storm Damage Reduction | $ 699,900 | $ 4,385,000 |
| Recreation | $ 292,100 | not computed |
| TOTAL ANNUAL BENEFITS | $ 992,000 | $ 4,385,000 |
| BENEFIT-TO COST RATIO | 1.20 | 12.10 |
| NET ANNUAL BENEFITS | $ 186,700 | $ 4,022,100 |

**TABLE 26**
**DADE COUNTY**
**SUMMARY OF COSTS AND BENEFITS**
**NED PLAN SEGMENTS**

| | Key Biscayne | Golden Beach | Sunny Isles |
|---|---|---|---|
| COSTS | | | |
| First Cost (MCACES) | $ 330,000 | $ 14,173,500 | $ 2,200,000 |
| Interest During Construction | $ 9,200 | $ 272,700 | $ 58,000 |
| TOTAL AVERAGE ANNUAL COST | $ 63,700 | $ 1,886,800 | $ 330,000 |
| BENEFITS | | | |
| Storm Damage Reduction | $ 65,700 | $ 3,683,300 | $ 345,800 |
| Recreation | $ 0 | $ 0 | $ 0 |
| TOTAL ANNUAL BENEFITS | $ 65,700 | $ 3,683,300 | $ 345,800 |
| BENEFIT-TO COST RATIO | 1.00 | 2.00 | 1.00 |
| NET ANNUAL BENEFITS | $ 2,000 | $ 1,796,500 | $ 15,800 |

assigned, except no costs are assigned to incidental recreation. Hurricane and storm damage reduction projects are cost shared at 65 percent Federal, and separable recreation projects are cost shared at 50 percent Federal. Cost sharing for beach erosion control measures must also consider shore ownership and use. Additional guidance oncost sharing for shore protection projects is provided in Engineering Regulation 1165-2-130 dated June 15, 1989.

**286a.** Section 940 of the WRDA of 1986 specifies cost allocation for shore damage mitigation. Costs for implementation of structural and nonstructural measures for the prevention or mitigation of shore damages attributable to Federal navigation works (including lands, easements, rights-of-way, relocations and disposal areas) are cost shared in the same proportion as the cost sharing provisions applicable to the project causing the shore damage. Specific Congressional authorization of a shore damage mitigation project is required if the Federal first cost exceeds $2,000,000.

**286b.** A non-Federal public body must agree to operate and maintain such measures, and in the case of interests in real property acquired in conjunction with nonstructural measures, to operate and maintain the property for public purposes in accordance with regulation prescribed by the Secretary of the Army. The Federal Government will not incur costs for access rights on properties a shore mitigation project is designed to protect.

**287.** Normally, non-Federal public shores are dedicated to park and conservation areas, and the benefits of protecting such shores are based on the loss of recreation outputs, with costs shared at 50 percent Federal and 50 percent non-Federal. Public parks and street ends in the project areas are also cost shared at 50 percent Federal and 50 percent non-Federal since the primary output for this shorefront is recreation. The cost sharing for protection of privately-owned shores resulting in public benefits is 65 percent Federal and 35 percent non-Federal. The cost for protection of undeveloped private lands is a 100 percent non-Federal responsibility. An example summary table of shore ownership and level of Federal participation for the 3 mile Jupiter/Juno reach in Palm Beach County is displayed in Table 27.

**288.** The cost of establishing the State's required erosion control line (ECL) is a non-Federal cost. Once this line has been approved, all project lands fronting the developed private shore within the project are considered open to use by the public. Federal projects consist of the project built both seaward and landward of the ECL. All

# TABLE 27

## JUPITER/JUNO SHORE PROTECTION PROJECT: APPORTIONMENT OF COSTS
## COAST OF FLORIDA STUDY - REGION III

| PROFILE LINE NUMBER (A) | LOT DESCRIPTION (B) | LOT WIDTH (FT) (C) | SHORELINE DESCRIPTION (D) | WITHIN PROJECT LIMITS (E) | WITHIN 1/4 MILE OF ACCESS (F) | SHORE T/ OWNERSHIP AND PROJECT PURPOSE (G) | LEVEL OF FEDERAL PARTN (H) | FEDERAL PARTICIPATION TIMES LOT WIDTH ((C)*(H)) (I) |
|---|---|---|---|---|---|---|---|---|
| R-13 | JUPITER INLET BCH PK | 400 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 200.0 |
| | subtotal | 400 | | | | | 50.00% | 200.0 |
| R-14 | JUPITER INLET BCH PK | 560 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 280.0 |
| | OCEAN TRAIL CONDO | 190 | DEVELOPED | Y | Y | II.A. | 65.00% | 123.5 |
| | subtotal | 750 | | | | | 53.80% | 403.5 |
| R-15 | OCEAN TRAIL CONDO | 870 | DEVELOPED | Y | Y | II.A. | 65.00% | 565.5 |
| | subtotal | 870 | | | | | 65.00% | 565.5 |
| R-16 | OCEAN TRAIL CONDO | 240 | DEVELOPED | Y | Y | II.A. | 65.00% | 156.0 |
| | JUPITER BCH HILTON | 395 | DEVELOPED | Y | Y | II.A. | 65.00% | 256.8 |
| | PRIVATE LOT | 250 | UNDEVELOPED | Y | Y | IV. | 0.00% | 0.0 |
| | subtotal | 885 | | | | | 46.64% | 412.8 |
| R-17 | PRIVATE LOT | 50 | UNDEVELOPED | Y | Y | IV. | 0.00% | 0.0 |
| | PRIVATE LOT | 520 | UNDEVELOPED | Y | Y | IV. | 0.00% | 0.0 |
| | PRIVATE LOT | 220 | UNDEVELOPED | Y | Y | IV. | 0.00% | 0.0 |
| | subtotal | 790 | | | | | 0.00% | 0.0 |
| R-18 | CARLIN PARK | 1350 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 675.0 |
| | subtotal | 1350 | | | | | 50.00% | 675.0 |
| R-19 | CARLIN PARK | 1210 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 605.0 |
| | subtotal | 1210 | | | | | 50.00% | 605.0 |
| R-20 | CARLIN PARK | 950 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 475.0 |
| | JUPITER REEF CLUB | 350 | DEVELOPED | Y | Y | II.A. | 65.00% | 227.5 |
| | subtotal | 1300 | | | | | 54.04% | 702.5 |

# TABLE 27 ( CONTINUED)

## JUPITER/JUNO SHORE PROTECTION PROJECT: APPORTIONMENT OF COSTS
## COAST OF FLORIDA STUDY - REGION III

| PROFILE LINE NUMBER (A) | LOT DESCRIPTION (B) | | LOT WIDTH (FT) (C) | SHORELINE DESCRIPTION (D) | WITHIN PROJECT LIMITS (E) | WITHIN 1/4 MILE OF ACCESS (F) | SHORE 1/ OWNERSHIP AND PROJECT PURPOSE (G) | LEVEL OF FEDERAL PARTN (H) | FEDERAL PARTICIPATION TIMES LOT WIDTH ((C)*(H)) (I) |
|---|---|---|---|---|---|---|---|---|---|
| R-21 | JUPITER REEF CLUB | | 290 | DEVELOPED | Y | Y | II.A. | 65.00% | 188.5 |
| | PUBLIC BEACH | | 750 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 375.0 |
| | | subtotal | 1040 | | | | | 54.18% | 563.5 |
| R-22 | PUBLIC BEACH | | 1060 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 530.0 |
| | | subtotal | 1060 | | | | | 50.00% | 530.0 |
| R-23 | PUBLIC BEACH | | 1080 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 540.0 |
| | | subtotal | 1080 | | | | | 50.00% | 540.0 |
| R-24 | PUBLIC BEACH | | 1120 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 560.0 |
| | | subtotal | 1120 | | | | | 50.00% | 560.0 |
| R-25 | PUBLIC BEACH | | 965 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 482.5 |
| | | subtotal | 965 | | | | | 50.00% | 482.5 |
| R-26 | PUBLIC BEACH | | 1030 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 515.0 |
| | | subtotal | 1030 | | | | | 50.00% | 515.0 |
| R-27 | PUBLIC BEACH | | 1115 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 557.5 |
| | | subtotal | 1115 | | | | | 50.00% | 557.5 |
| R-28 | PUBLIC BEACH | | 985 | PUBLIC BEACH | Y | Y | II.B. | 50.00% | 492.5 |
| | | subtotal | 985 | | | | | 50.00% | 492.5 |

# TABLE 27 (CONTINUED)

## JUPITER/JUNO SHORE PROTECTION PROJECT: APPORTIONMENT OF COSTS
## COAST OF FLORIDA STUDY - REGION III

| PROFILE LINE NUMBER (A) | LOT DESCRIPTION (B) | LOT WIDTH (FT) (C) | SHORELINE DESCRIPTION (D) | WITHIN PROJECT LIMITS (E) | WITHIN 1/4 MILE OF ACCESS (F) | SHORE 1/ OWNERSHIP AND PROJECT PURPOSE (G) | LEVEL OF FEDERAL PARTN (H) | FEDERAL PARTICIPATION TIMES LOT WIDTH ((C)*(H)) (I) |
|---|---|---|---|---|---|---|---|---|
| TOTALS FOR PROJECT | | 15,950 | SHORELINE LENGTH (Feet) | | | | | |
| | | 3.0 | SHORELINE LENGTH (Miles) | | | | SUM OF COLUMN (I) IN FEET = | 7,805 |

THE SUM OF COLUMN (I) DIVIDED BY 15,950 FEET = 48.94 PERCENT
WHICH IS THE FEDERAL SHARE OF CONSTRUCTION COSTS SUCH AS ADVANCE NOURISHMENT COSTS WHICH ARE LINEARLY DISTRIBUTED ALONG THE PROJECT.

1/ SHORE OWNERSHIP AND PROJECT PURPOSE
(As defined in ER 1165-2-130)

| | | Max Level Fed Participation Construct Costs |
|---|---|---|
| I. | Federally Owned | 100.00% |
| II. | Publicly and Privately Owned – Protection Results in Public Benfits. | |
| A. | Hurricane and Storm Damage Reduction | 65.00% |
| B. | Private and Public Land Open for Public Use – Recreation | 50.00% |
| C. | Separable Recreation | 50.00% |
| III. | Privately Owned, Use Limited to Private Interests | 0.00% |
| IV. | Privately Owned, Undeveloped | 0.00% |

construction landward of the ECL on private property is 100 percent non-Federal. Periodic nourishment is considered "construction" for cost sharing purposes.

**289.** The apportionment of project costs are determined for both linear and non-linear costs. The volume of design fill placed along a given reach of project shoreline varies considerably. The cost to construct the design section is therefore a non-linear cost. Linear costs are those project costs which are uniformly distributed throughout the length of the project (i.e., periodic nourishment and overfill costs). Linear costs are also costs applied to the projects as a whole, such as mobilization and demobilization costs, monitoring, contingencies, engineering and design, contract supervision and contract administration.

**290.** Revised Policy Guidance Letter 11 (issued by CECW-RP, 21 April 1989) directs the use of the "Federal rule of valuation" which provides for an offset of benefits in determining compensation for properties including severance. Lands seaward of the ECL may have value; credit for these lands will be based on the Federal rules of valuation. The non-Federal project sponsor is entitled to credit for administrative costs incurred in providing lands for Federal projects except for lands in front of vacant private lots. The administrative costs for upland temporary construction easements are not part of the Federal total project costs and are a non-Federal responsibility.

**Cost Apportionment**

**291.** Table 28 shows the apportionment of costs for the beach fill project modifications based on analysis similar to Table 27. The cost-sharing for the Lake Worth Inlet Sand Transfer Plant will be 100 percent Federal due to mitigation of the adverse effects of the Federal deep draft navigation project at Lake Worth Inlet (Palm Beach Harbor). The South Lake Worth Sand Transfer Plant is designed for a target bypassing rate of 120,000 cubic yards per year. The sediment deficit on the south side of the inlet is 98,000 cubic yards. A surplus volume of 22,000 cubic yards per year will occur when the South Lake Worth Sand Transfer Plant is in operation, which is 18 percent of the total volume. The Federal Share will be 65 percent of that percentage for a total of 12 percent. The Non-Federal Share will be 88 percent.

**292.** Final apportionment is based on current law and conditions of shore ownership and use at the time of project construction or subsequent nourishment, except for the shore damage mitigation project at Lake Worth Inlet. Public

## TABLE 28

### COAST OF FLORIDA STUDY - REGION III
### COST APPORTIONMENT - INITIAL CONSTRUCTION

| Project | Federal Share | Non-Federal Share |
|---|---|---|
| **PALM BEACH COUNTY** | | |
| 1. Juno Beach/Ocean Cay | 44.10% | 55.90% |
| 2. Lake Worth Inlet Sand Transfer Plant | 100.00% | 0.00% |
| 3. N. Palm Beach Island | 59.40% | 40.60% |
| 4. South Lake Worth Inlet Sand Transfer Plant | 12.00% | 88.00% |
| 5. Palm Beach Island | 32.20% | 67.80% |
| 6. S. Palm Beach Island | 50.70% | 49.30% |
| 7. Delray Beach | 57.90% | 42.10% |
| 8. Highland Beach | 60.60% | 39.40% |
| **BROWARD COUNTY** | | |
| 9 Deerfield/Hillsboro Beach | 40.00% | 60.00% |
| 10. Pompano | 64.30% | 35.70% |
| 11. Fort Lauderdale | 55.90% | 44.10% |
| 12. Dania | 65.00% | 35.00% |
| 13. Hollywood/Hallandale | 62.50% | 37.50% |
| **DADE COUNTY** | | |
| 14. Golden Beach | 65.00% | 35.00% |
| 15. Sunny Isles | 38.30% | 61.70% |
| 16. Miami Beach | 59.80% | 40.20% |
| 17. Key Biscayne | 48.90% | 51.10% |

ownership and use of the mitigation project at Lake Worth Inlet is not required. Cost sharing for non-linear costs (i.e., the quantity of design volume) for the shore protection projects would be based on the last physicalsurvey of shoreline conditions prior to construction. This survey is normally the contract plans and specifications survey.

**Federal Responsibility**

**293.** The U. S. Army Corps of Engineers is responsible for budgeting for the Federal share of construction costs for Federal civil works projects. Federal funding is subject to budgetary constraints inherent in the formation of the national civil works budget for a given fiscal year. The Corps will perform the necessary planning, engineering, and design needed prior to construction. The Corps will provide an O&M manual to the sponsor. The Corps will obtain all necessary permits including State water quality certification. The Corps will construct the projects with an upfront cash contribution from the non-Federal project sponsors, except for construction of the sand transfer plant at Lake Worth Inlet, which would be constructed at Federal expense.

**Non-Federal Responsibility**

**294.** The non-Federal project sponsors would provide an up-front cash contribution for initial construction of proposed projects. The non-Federal sponsors would also provide the entire cost of all material placed on undeveloped private lands and share in the placement of fill on developed private lands and public lands landward of the ECL, except for the shore damage mitigation project at Lake Worth Inlet. The costs for lands, easements, and rights-of-way and a portion of the administrative costs associated with land requirements are also a non-Federal responsibility. Although Federal implementation of a Federal shore damage mitigation project may include costs for lands, easements, rights-of-way, relocations, and disposal areas, the Federal Government will not incur costs for access rights over or on properties the mitigation proposal is designed to protect. The sponsor of a Federal navigation mitigation project must agree to operate and maintain the structural and non-structural measures of the shore damage mitigation project.

**Other Non-Federal Requirements**

**295.** Other general non-Federal responsibilities including continued public use of the project beach, control of water pollution to safeguard the health of bathers, and operation and maintenance of the project beaches must be assumed by

the non-Federal sponsor. Operation and maintenance activities include beach berm reshaping and beach tilling. The delineation of Federal and non-Federal responsibilities will be defined in the project cooperation agreement (PCA) for each proposed project.

**295a.** Corps policy normally forbids the placement of fill to renourish lands landward of the ECL unless the sponsor has acquired the right to provide public access to such lands or unless there is some other Federal interest for such placement of fill behind the ECL. Engineering necessity may provide such a Federal interest, as where the stability of the slope of a sand dune requires the deposit of sand on private land. Also, the need to taper the ends of a renourishment area of a beach or maintain continuity may require the inclusion of small segments of private lands. However, absent a Federal interest, renourishment fill will not be placed behind the ECL.

**Financial Analysis**

**296.** Financial analysis is required for any plan being considered for Corps of Engineers implementation that involves non-Federal cost sharing. The ultimate purpose of the financial analysis is to ensure that non-Federal sponsors understand the financial commitment involved and have reasonable plans for meeting that commitment. The financial analysis shall include the non-Federal sponsor's statement of financial capability, the non-Federal sponsor's financing plan, and a Corps assessment of the sponsor's financial capability.

**STUDY SUMMARY**

**297.** This report summarizes the preconstruction studies conducted for Region III in the interest of beach erosion control and storm damage prevention. Based on these studies, the following was concluded:

**298.** Storm damage may impact 21.8 miles of Atlantic shoreline in Palm Beach County, 21.0 miles of Atlantic shoreline in Broward County and 16.7 miles of Atlantic Shoreline in Dade County. The amount of shorefront development threatened by storms is $2,150,022,525 in Palm Beach County, $3,053,709,269 in Broward County and $1,612,470,515 in Dade County.

**299.** A contributing factor to the susceptibility to storm damage is relative sea level rise. If the upper limit of relative sea level rise actually occurs, it will increase the shoreline recession and storm damages estimated within this report.

**300.** The most practical and economical means to prevent or reduce structural damages is to construct the authorized shore protection projects as modified herein.

**301.** The non-Federal sponsors, Palm Beach, Broward, and Dade Counties, as well as numerous municipalities, support construction of the projects.

**ENVIRONMENTAL CONSIDERATIONS**

**302.** The alternative plans identified herein have been formulated with environmental data and constraints taken into consideration, i.e., where possible, the projects were developed considering a 200-foot buffer around identified nearshore hardground areas and a 400-foot buffer around identified hardground areas adjacent to borrow sites. The draft Environmental Impact Statement (EIS) is included in this report. The use of Aragonite and upland sand sources as a potential source of borrow material is also addressed in the draft EIS and the Geotechnical Appendix (Appendix E).

**FLOOD PLAIN DEVELOPMENT**

**303.** The authorized shore projects and proposed project modifications, as well as the proposed shore damage mitigation project, are in the base flood plain (100-year flood), and have been evaluated in accordance with Executive Order 11988. Relocation of the projects outside the flood plain would not be responsive to the problems and needs of the study area and was not considered further. A non-flood plain alternative for the potential development with the projects would be to restrict all future development to those areas outside the flood plain or elevated above the flood plain. Potential flood plain development as a result of project implementation would be minimal. The continued nourishment of projects would have minimum impact on the natural and beneficial values of the flood plain. In the without project flood plain (that area immediately adjacent to the project), there will be minimal loss of natural resources due to potential development. Implementation of any non-structural plans that would minimize potential damage to or within the flood plain beyond those laws and regulations already adopted by local and State interests are not viable solutions under the planning constraints of this study.

**FLOOD PLAIN MANAGEMENT AND FLOOD INSURANCE PROGRAMS COMPLIANCE**

**304.** Section 402 of the Water Resources Development Act of 1986 (PL 99-662) as amended by Section 14 of the Water Resources Development Act of 1988 (PL 100-676) states

"Before construction of any project for local flood protection or any project for hurricane or storm damage reduction, the non-Federal interests shall agree to participate in and comply with applicable Federal flood plain management and flood insurance programs." To date, Palm Beach, Broward, and Dade Counties are enrolled in and in compliance with the national Flood Insurance Program.

**USE OF OUTER CONTINENTAL SHELF LANDS**

**305.** The Outer Continental Shelf Lands Act (OCSLA) enacted August 7, 1953, as amended (enclosed) grants the Secretary of the Interior authority to grant to qualified persons offering the highest competitive bid leases of any mineral other than oil, gas, and sulfur in any area of the Outer Continental Shelf. The OCSLA was amended by Section 1 of Public Law 103-426, October 31, 1994. The Secretary of the Interior may negotiate the use of Outer Continental Shelf sand, gravel and shell resources for use in a program of, or project for, shore protection, beach restoration or coastal wetlands restoration undertaken by a Federal, State or local government agency; or for a project that is funded in whole or in part by or authorized by the Federal Government. Section 1(a)(2)(B) of the 1994 amendment prohibits the assessment of any fees against an agency of the Federal government, directly or indirectly.

**306.** Any Federal agency which proposes to make use of sand, gravel and shell resources subject to the OCSLA shall enter into a Memorandum of Agreement with the Secretary of the Interior. The Secretary of the Interior is also required to notify the Committee on Merchant Marine and Fisheries and the Committee on Natural Resources of the House of Representatives, and the Committee on Energy and Natural Resources of the Senate on any proposed project for the use of those resources prior to the use of those resources.

**307.** There are borrow sites for Palm Beach County located on the Outer Continental Shelf and none for Broward and Dade Counties. However, there are numerous sites within the three mile limit. It would be highly unlikely that an Outer Continental Shelf borrow site would be used in Region III.

**COASTAL BARRIER RESOURCES ACT**

**308.** The proposed shore protection project modifications, and the proposed shore damage mitigation project, do not include any recommendations which would result in any new Federal expenditures or financial assistance prohibited by the Coastal Barrier Resources Act (Public Law 97-348); nor were funds obligated in past years for the authorized and

constructed project segments in Palm Beach, Broward, and Dade Counties for purposes prohibited by this Act.

**COASTAL ZONE MANAGEMENT ACT**

**309.** The Coastal Zone Management (CZM) Act of 1972, as amended (PL 92-583) requires all Federal activities inside or outside a state's coastal zone to be consistent with the state's coastal zone management plan if the activities affect natural resources, land uses, or water uses within the coastal zone. By issuance of State Water Quality Certifications on completed shore protection projects in Region III, the State has determined that the authorized projects for which initial construction has been completed were consistent with the State CZM Act. The State will review future project work to determine if it is consistent with the State's coastal zone management plan prior to any future project construction or future nourishment of any previously constructed projects.

**COST EFFECTIVENESS OF DESIGN**

**310.** Section 911 of Public Law 99-662 requires a cost effectiveness review of project designs for water resources projects which have a total cost in excess of $10,000,000, and for which construction has not been initiated by November 17, 1986. The review shall employ cost control techniques which will ensure that such projects are designed in the most cost-effective way for the life of the project. Engineering Circular No. 1110-2-259 dated February 1, 1989 provides guidance for implementing cost control techniques for projects in accordance with Section 911.

**311.** The District Engineer will certify, based on the recommendations of the project design review teams, that the designs achieved in the preconstruction, engineering and design phases are the most cost effective designs.

**PUBLIC ACCESSIBILITY**

**312.** In determination of the Federal interest in cost-sharing, Federal participation is limited to the areas where adequate public parking and access are provided, except for the proposed shore damage mitigation project at Lake Worth Inlet. Federal participation is limited to those shoreline reaches within 1/4 mile from an access point, a reasonable walking distance for a beach visitor. For shoreline reaches farther than 1/4 mile from public parking and/or beach access point, Federal participation will not be provided, unless, public accessibility is improved prior to project construction. In areas, where public access requirements

were not met, the cost apportionment was adjusted to be 100 percent Non-Federal.

**CONCLUSIONS**

**313.** The Coast of Florida Erosion and Storm Effects Study, Region III, provided an opportunity to evaluate coastal problems and alternatives on a regional basis. As a result, new innovative and cost effective erosion control measures were considered. In addition, the data collected as part of the Region III study have been assimilated into a geographic information system. The Region III database provides a quantitative body of knowledge for use by coastal engineers and planners in the evaluation of management schemes and solutions which address erosion, storm damage, and coastal flooding problems.

**314.** Consideration has been given to all significant aspects of the authorized projects in the overall public interest, including engineering feasibility, economic, social and environmental effects. Modifications to authorized projects and the development of new projects described in this report provide the optimum solution for protection of upland development for Region III.

**RECOMMENDATIONS**

**315.** The Administration's Civil Works Program reflects the President's commitment to focus limited Federal budgetary resources on the development of water resources projects and purposes that have national significance. Accordingly, the Administration is not budgeting for any new construction starts for shore protection projects or studies, which are best left to state and local governments. The U.S. Army Corps of Engineers has begun a phase out of the Corps' role in shore protection and beach erosion control. The current phase of each study, project, or separable element will be completed but new phases will not be initiated.

**315a.** Accordingly, I do not recommend that the existing projects for Region III, Palm Beach, Broward and Dade Counties be modified in accordance with the selected plan described in this report, with the exception of the Dania, Lake Worth Sand Transfer Plant and South Lake Worth Sand Transfer Plant projects. These projects, as discussed herein, provide costs savings to the Federal Government in reducing required renourishment volumes for the lives of previously authorized projects. I further recommend that the Federal navigation project at Palm Beach Harbor be modified to include Federal construction of a new sand transfer system at Lake Worth Inlet in order to mitigate for

the adverse effects of the navigation project on the downdrift shoreline.

**316.** These recommendations are made with the provision that the project sponsor will enter into a written Project Cooperation Agreement, as required by Section 221 of PL 91-611, as amended, to provide local cooperation satisfactory to the Secretary of the Army. Such local cooperation shall provide the following non-Federal responsibilities:

a. * Provide 35 percent of total project costs assigned to hurricane and storm damage reduction plus 50 percent of total project costs assigned to recreation, plus 100 percent of total storm damage project costs assigned to privately owned shores (where use of such shores is limited to private interests), and as further specified below:

a. (1) * Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or ensure the performance of all relocations determined by the Federal Government to be necessary for the construction, operation, and maintenance of the Project.

a. (2) * Provide all improvements required on lands, easements, and rights-of-way to enable the proper disposal of dredged or excavated material associated with the construction, operation, and maintenance of the project. Such improvements may include, but are not necessarily limited to, retaining dikes, waste weirs, bulkheads, embankments, monitoring features stilling basins, and dewatering pumps and pipes.

a. (3) * Provide, during construction, any additional amounts as are necessary to make its total contribution equal to 35 percent of total project costs assigned to hurricane and storm damage reduction plus 50 percent of total storm damage project costs assigned to recreation, plus 100 percent of total project costs assigned to privately owned shores (where use of such shores is limited to private interests).

b. * For so long as the Project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed Project, or functional portion of the Project, at no cost to the Federal Government, in a manner compatible with the Project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal Government.

c. * Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the Non-Federal Sponsor, now or hereafter, owns or controls for access to the Project for the purpose of inspection, and, if necessary after failure to perform by the Non-Federal Sponsor, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the Project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Federal Government shall operate to relieve the Non-Federal Sponsor of responsibility to meet the Non-Federal Sponsor's obligations, or to preclude the Federal Government from pursuing any other remedy at law or equity to ensure faithful performance.

d. * Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the Project and any Project-related betterments, except for damages due to the fault or negligence of the United States or its contractors.

e. * Keep, and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the Project in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR) Section 33.20.

f. * Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law (PL) 96-510, as amended, 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the construction, operation, and maintenance of the Project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the Non-Federal Sponsor with prior specific written direction, in which case the Non-Federal Sponsor shall perform such investigations in accordance with such written direction.

g. * Assume complete financial responsibility, as between the Federal Government and the Non-Federal Sponsor for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be

necessary for the construction, operation, or maintenance of the Project.

h. * As between the Federal Government and the Non-Federal Sponsor, the Non-Federal Sponsor shall be considered the operator of the project for the purpose of CERCLA liability. To the maximum extent practicable, operate, maintain, repair, replace and rehabilitate the Project in a manner that will not cause liability to arise under CERCLA.

i. * Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, required for the construction, operation, and maintenance of the Project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

j. * Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

k. * Provide 35 percent of that portion of total historic preservation mitigation and data recovery costs attributable to hurricane and storm damage reduction that are in excess of one percent of the total amount authorized to be appropriated for hurricane and storm damage reduction.

l. * Provide 50 percent of that portion of total historic preservation mitigation and data recovery costs attributable to recreation that are in excess of one percent of the total amount authorized to be appropriated for recreation.

m. * Provide 100 percent of that portion of total historic preservation mitigation and data recovery costs attributable to privately owned shores (where use of such shores is limited to private interests) that are in excess of one percent of the total amount authorized to be appropriated for privately owned shores (where use of such shores is limited to private interests).

n. * Participate in and comply with applicable Federal floodplain management and flood insurance programs.

o. * Publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the floodplain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with the protection provided by the project.

P. * For so long as the storm damage project remains authorized, the Non-Federal Sponsor shall ensure continued conditions of public ownership and use of the shore upon which the amount of Federal participation is based, except that public ownership of the shore damage mitigation project at Palm Beach Harbor is not required.

q. * Provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms, except that public ownership of the storm damage mitigation project at Palm Beach Harbor is not required.

**317.** The recommendations contained herein reflect the information available at this time, and current Department of the Army policies and Federal law governing formulation of individual project modifications. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program, nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations for modifications to authorized storm damage reduction projects, recommendations for new storm damage reduction projects, and the recommendation for shore damage mitigation project at Palm Beach Harbor, and information in this report may be modified before it is transmitted to higher authority as proposals for project modification and/or implementation funding.

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Colonel, U. S. Army
District Engineer

**REFERENCES**


Balsillie, J.H., 1988, "Florida's Beach and Coast Preservation Program; An Overview." Beaches and Shores Special Report No 88-2. Florida Department of Natural Resources.

Clark, R.R., 1990, "Beach Conditions in Florida; a Statewide Inventory and Identification of the Beach Erosion Problem Areas in Florida." Beaches and Shores Technical and Design Memorandum 89-1. Tallahassee: Florida Department of Natural Resources.

Doyle, L.J., D.C. Sharma, A.C. Hine, O.H. Pilkey, Jr., W.J. Neal, O.H. Pilkey, Sr., D. Martin, and D.F. Belknap, 1984, "Living with the West Florida Shore." Durham, North Carolina; Duke University Press.

Florida Atlantic University/Florida International University Joint Center for Environmental and Urban Problems, 1986, "A Coastal Barriers Resource Manual." Tallahassee: Florida Department of Community Affairs.

Florida Division of Beaches and Shores, Department of Natural Resources, n.d., In-house studies. Unpublished memoranda.

Glassman, H., 1983, "The State of Florida 'Save Our Coast Program'." In "Preventing Coastal Flood Disasters: The Role of the States and Federal Response." Proceedings of a National Symposium, Ocean City, Maryland, May 23-25, 1983. 81-83. Special Publication No. 7. Boulder, Colorado: Association of State Floodplain Managers and the University of Colorado, Natural Hazards Research and Applications Information Center.

Godschalk, D.R., D.J. Brower, and T. Beatley, 1989, "Catastrophic Coastal Storms." Durham, North Carolina: Duke University press. Kusler, J., 1983, "Welcome Overview." In "Preventing Coastal Flood Disasters: The Role of the States and Federal Response," Proceedings of a National Symposium, Ocean City, Maryland, May 23-25, 1983. 1-34. Special Publication No.7. Boulder, Colorado: Association of State Floodplain Managers and the University of Colorado, Natural Hazards Research and Applications Information Center.

National Research Council, 1990, "Managing Coastal Erosion." Washington, D.C.: National Academy Press.

**CERTIFICATION OF PUBLIC ACCESSIBILITY**
**COAST OF FLORIDA, REGION III, SHORE PROTECTION PROJECTS**

1. As part of the obligations established in the project cooperation agreement for the Coast of Florida, Region III, Shore Protection Projects, the non-Federal sponsor shall assure continued conditions of public ownership and public use of the shore upon which Federal participation is based during the economic life of the project. The non-Federal sponsor shall also provide and maintain necessary access roads, parking areas and other public use facilities, open and available to all on equal terms. Public accessibility and use of the shore damage mitigation project recommended for Palm Beach Harbor are not required for such projects.

2. In the determination of the Federal interest in cost sharing, Federal participation was limited for the storm damage reduction projects to areas where adequate parking and access are available. For shoreline reaches further than 1/4 mile from public parking and/or beach access points, Federal participation was not provided.

3. A recreation benefit analysis is presented in Appendix F. The project areas has sufficient parking to meet the peak demand on any day of the year.

4. I therefore conclude that there is reasonable public beach access and use of the project beaches in all areas where Federal participation is provided.

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District Engineer

MAIN TEXT PLATES